

WHAT IS CLAIMED IS:

1. A wavelength converted light emitting apparatus comprising:

5 a substrate having an upper surface formed with first and second conductive patterns, at a partial region of the first conductive pattern and at the second conductive pattern being formed first and second connection bumps, respectively;

10 a light emitting diode having first and second surfaces opposite to each other, and a side surface connected between the first and second surfaces, the first surface being formed with first and second electrodes, the light emitting diode being disposed at the upper surface of the substrate so that the first and second electrodes are connected to the first and second
15 connection bumps, respectively; and

a phosphor layer formed along the second surface and side surface of the light emitting diode by a certain thickness, the phosphor layer serving to convert a wavelength of light emitted from the light emitting diode.

20

2. The apparatus as set forth in claim 1, wherein: the light emitting diode emits ultraviolet or blue light; and

the phosphor layer is a material for converting the light emitted from the light emitting diode into white light.

3. The apparatus as set forth in claim 1, wherein the phosphor layer extends from the side surface of the light emitting diode so as to reach to the upper surface of the substrate.

5

4. The apparatus as set forth in claim 1, wherein the phosphor layer is formed by a physical vapor deposition, chemical vapor deposition, or spin coating method.

10

5. The apparatus as set forth in claim 1, wherein the phosphor layer is formed by a sputtering method.

15

6. The apparatus as set forth in claim 1, wherein: the light emitting diode further has a transparent substrate, first and second conductive semiconductor layers and an active layer, which are successively stacked on the transparent substrate in multiple layers;

the first and second electrodes are formed on the first and second conductive semiconductor layers, respectively; and

20

one surface of the transparent substrate opposite to the surface formed with the first conductive semiconductor layer is provided as the second surface of the light emitting diode.

7. The apparatus as set forth in claim 6, wherein the

phosphor layer is formed along one surface of the transparent substrate provided as the second surface of the light emitting diode, and along the side surfaces of the transparent substrate, the first and second conductive semiconductor layers and active layer, by a certain thickness.

8. The apparatus as set forth in claim 1, wherein: the substrate is a conductive substrate provided with a rear surface electrode; and

10 the first conductive pattern is formed on an insulation layer provided at the conductive substrate, and the second conductive pattern is formed in a region where the insulation layer is removed so as to be connected with the conductive substrate, thereby being connected to the rear surface electrode.

15

9. A method of manufacturing a wavelength converted light emitting apparatus comprising the steps of:

a) preparing a light emitting diode having first and second surfaces opposite to each other, and a side surface connected between the first and second surfaces, the first surface being formed with first and second electrodes;

b) preparing a substrate having an upper surface formed with first and second conductive patterns, and forming first and second connection bumps at a partial region of the first

conductive pattern and at the second conductive pattern, respectively;

c) disposing the light emitting diode at the upper surface of the substrate, and connecting the first and second electrodes
5 of the light emitting diode to the first and second connection bumps, respectively; and

d) forming a phosphor layer along the second surface and side surface of the light emitting diode by a certain thickness, the phosphor layer serving to convert a wavelength of light
10 emitted from the light emitting diode.

10. The method as set forth in claim 9, wherein: the light emitting diode emits ultraviolet or blue light: and

the phosphor layer is a material for converting the light
15 emitted from the light emitting diode into white light.

11. The method as set forth in claim 9, wherein the step d) is the step of forming the phosphor layer so that the phosphor layer extends along the second surface and side surface of the
20 light emitting diode, and reaches the upper surface of the substrate extending from the side surface of the light emitting diode.

12. The method as set forth in claim 9, wherein the step d)

includes the steps of:

d-1) forming a photoresist at a terminal connection region provided on an upper surface of at least one of the first and second conductive patterns, the terminal connection region being
5 connected to an external terminal;

d-2) forming the phosphor layer on the substrate on which the light emitting diode is disposed; and

d-3) removing the photoresist.

10 13. The method as set forth in claim 12, wherein the step d-2) is performed by using one process selected from among a group consisting of physical vapor deposition, chemical vapor deposition, and spin coating methods.

15 14. The method as set forth in claim 12, wherein the step d-2) is performed by a sputtering method.

20 15. The method as set forth in claim 9, wherein: the light emitting diode is formed by successively stacking a first conductive semiconductor layer, an active layer, and a second conductive semiconductor layer on a transparent substrate in multiple layers;

the first and second electrodes are formed on the first and second conductive semiconductor layers, respectively; and

one surface of the transparent substrate opposite to the surface formed with the first conductive semiconductor layer is provided as the second surface of the light emitting diode.

5 16. The method as set forth in claim 15, wherein the step d) is the step of forming the phosphor layer along one surface of the transparent substrate provided as the second surface of the light emitting diode, and along the side surfaces of the transparent substrate; the first and second conductive
10 semiconductor layers and active layer, by a certain thickness.

17. The method as set forth in claim 9, wherein the step b) includes the steps of:

 b-1) preparing the conductive substrate;
15 b-2) forming an insulation layer on the upper surface of the conductive substrate;
 b-3) forming the first and second conductive patterns;
 b-4) forming a rear surface electrode at a lower surface of the conductive substrate; and
20 b-5) forming the first and second connection bumps at the partial region of the first conductive pattern and at the second conductive pattern, respectively,

 wherein the step b-3) includes the steps of:

 b-3-1) forming the first conductive pattern on the

insulation layer: and

b-3-2) forming the second conductive pattern at a region of the upper surface of the conductive substrate, the region being exposed to the outside by removing a corresponding partial region
5 of the insulation layer.